Sustainable Transportation in the City of Tualatin

Fall 2017 • Planning, Public Policy, and Management

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UNIVERSITY OF OREGON
TRIMET
SCI Sustainable Cities Initiative
SCYP Sustainable City Year Program

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Susan Noack • Aging Task Force

About SCI

The Sustainable Cities Initiative (SCI) is a cross-disciplinary organization at the University of Oregon that promotes education, service, public outreach, and research on the design and development of sustainable cities. We are redefining higher education for the public good and catalyzing community change toward sustainability. Our work addresses sustainability at multiple scales and emerges from the conviction that creating the sustainable city cannot happen within any single discipline. SCI is grounded in cross-disciplinary engagement as the key strategy for improving community sustainability. Our work connects student energy, faculty experience, and community needs to produce innovative, tangible solutions for the creation of a sustainable society.

About SCYP

The Sustainable City Year Program (SCYP) is a year-long partnership between SCI and a partner in Oregon, in which students and faculty in courses from across the university collaborate with a public entity on sustainability and livability projects. SCYP faculty and students work in collaboration with staff from the partner agency through a variety of studio projects and service-learning courses to provide students with real world projects to investigate. Students bring energy, enthusiasm, and innovative approaches to difficult, persistent problems. SCYP's primary value derives from collaborations resulting in on-the-ground impact and expanded conversations for a community ready to transition to a more sustainable and livable future.

SCI Directors and Staff

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About TriMet

The Tri-County Metropolitan Transportation District of Oregon was created by the Oregon Legislature in 1969 to operate and oversee mass transit in the Portland Metropolitan region. This public entity was formed by the legislature as a municipal corporation to replace the multiple private interest mass transit companies that previously operated in Multnomah County, Clackamas County, and Washington County; the counties that make up TriMet.

In addition to operating bus lines, light rail, and paratransit in the defined Tri-Metropolitan district, TriMet also connects to external mass transit services to provide wider blanket coverage for the region. TriMet's nationally recognized transit system provides more than 100 million rides annually, and carries 45% of rush hour commuters going into the downtown Portland area. TriMet not only moves people, but helps build sustainable cities by improving public health; creating vibrant, walkable communities; supporting economic growth; and working to enhance the region's livability.

Several civic leaders have been highlighted as key Figures in the creation, establishment, and ultimate success of TriMet. Governor Tom McCall is credited with the initial call for the creation of the public corporation; other key contributors include Congressman Earl Blumenauer, Rick Gustafson, Dick Feeney, and Mayor Neil Goldschmidt. All were instrumental in shaping the organization itself, as well as the land use, civic development, and transformation policies that make TriMet the success that it is today.

The vision and efforts of these individuals and countless others have borne fruit. Recently, TriMet celebrated the second anniversary of the opening of its most recent light rail line. Since its inauguration the 7.3-mile MAX Orange Line has experienced continued growth, having a six percent year-to-year increase in ridership. Illustrating the holistic approach that has been a part of TriMet from its inception, there have been wider community benefits such as a positive impact on employment and a focus on sustainable practices such as bio-swales, eco-roofs, a first-in-the-nation eco-track segment, solar paneling, and regenerative energy systems.

TriMet is a key partner in the region's Southwest Corridor Plan and Shared Investment Strategy. Eleven partner agencies are participating in planning for a new 12-mile light rail line in southwest Portland and southeast Washington County that will also include bicycle, pedestrian, and roadway projects to improve safety and access to light rail stations. Southwest Corridor stakeholders include Metro (the regional government), Washington County, Oregon Department of Transportation, and the cities of Beaverton, Durham, King City, Portland, Sherwood, Tigard, and Tualatin. This collaborative approach strives to align local, regional, and state policies and investments in the Corridor, and will implement and support adopted regional and local plans. These initiatives and outcomes from participation with the UO's Sustainable City Year Program will help develop ideas that are cost-effective to build and operate, provide safe and convenient access, and achieve sustainability goals while supporting the corridor's projected growth in population and employment.

Course Participants

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Executive Summary

This report formally documents the ideas and proposals made to the city of Tualatin by the University of Oregon's Sustainable Transportation class in the Planning, Public Policy, and Management program. The class met with city officials and community members to hear suggested improvements, performed site visits to see what could be done, and then cultivated work in response to the goals of the city and its residents. These goals were as follows:

- Increase accessibility for employers and employees.
- Reduce congestion felt by the entire city and its neighbors.
- Design (or redesign) transportation systems to accommodate an aging population and children.

The work produced by the class was broken into three themes:

Theme 1: Walking

The class proposed ways to optimize the pedestrian safety and experience. This included proposals such as physical barriers between vehicles, redirecting traffic to avoid high-volume pedestrian crossings, and thematic signage to aid wayfinding.

Theme 2: Biking

The class proposed ways to prioritize bicycle infrastructure and cyclist safety. This included the implementation of a bicycle boulevard, increased visibility in high-volume automobile corridors, and the redesign of some streets to allow for more comfortable bicycling along vehicles.

Theme 3: Transit

The class proposed ways to prioritize transit use in Tualatin and improve connections between existing transit stations. This included a proposed bus rapid transit route, transit stops throughout the city, and the redesign of some streets to allow for prioritized transit access.

Introduction

Tualatin, Oregon, is a city that developed during an automobile-centered era and that is now experiencing the difficulties associated with doing so. Tualatin's increase in population and successful economic development has led to more people and industry, as well as congested streets. This growth has made the city challenging to traverse. The goal of this project is to offer feasible solutions that can help the city of Tualatin in meeting their goals:

- Increase accessibility for employers and employees.
- Reduce congestion felt by the entire city and its neighbors.
- Design (or redesign) transportation systems that accommodate an aging population and children.

To help the city meet these goals, the students of Marc Schlossberg's Sustainable Transportation class worked for ten weeks to offer suggestions, proposals, and ideas that would help the current state of congestion in Tualatin. In the process of implementing sustainable transportation principles aimed at alleviating congestion, the transportation system inherently becomes more accommodating and accessible for everyone. Additionally, other than meeting the goals above, developing a city's sustainable transportation options has profound impacts on its carbon footprint.

Theme 1: Walking

Improvements to 72nd Avenue

There are currently two pedestrian crossings that allow pedestrians to travel from the Park and Ride to Bridgeport Village.

The north crossing across SW 72nd Avenue has fairly safe amenities in place. However, the natural pedestrian entrance to Bridgeport Village is the south crossing of SW 72nd Avenue. To help facilitate movement, we recommend a redesign of this crossing to allow for safer pedestrian trips. Our proposal is to remove the sweeping westbound right turn on Lower Boones Ferry Road at the intersection of Lower Boones Ferry Road and SW 72nd Avenue. This is because the high speed merge onto SW 72nd Ave creates a safety issue for pedestrians attempting to cross that travel lane. The lane does not have a light for a protected pedestrian

Figure 1: Proposed redesign for the 72nd Street right turn with a protected bicycle lane and pedestrian bump out

crossing, and the area also creates a conflict for cyclists. To help make this safer for pedestrians, we recommend that the city creates a pedestrian bump out that would also allow bicycle traffic (Figure 1).

The sweeping right turn lane would be made into a smaller, protected bicycle lane. The traffic would then be directed to make a hard right turn at the intersection ahead. This will slow the speed of traffic, allow for safer and shorter pedestrian crossing, and provide an increased level of safety for cyclists traveling around this corner.

Another option is a high intensity activated crosswalk (HAWK), also known as the Pedestrian Hybrid Beacon, across SE 72nd Street. The HAWK crosswalk is meant for midblock insertion and results in traffic calming. The crosswalk stops traffic with multiple lights and allows pedestrians to safely cross high traffic roads. We recommend that the HAWK be placed at the crosswalk between Lower Boones Ferry Road and the entrance to Bridgeport Village. We also recommend adding warning lights on the right turn of Lower Boones Ferry Road to help warn drivers of an approaching light change.

This type of crosswalk can be a nuisance for drivers, as it stops traffic abruptly. But to pedestrians, this crosswalk is appropriate, as it slows down traffic and provides a safe, mediated street crossing experience. In an automobile-oriented society, reducing traffic lanes and providing crosswalks supports equity and accessibility, which is one of the city's goals.

Theme 2: Biking

Infrastructure Connections

We propose the restriping of SW Herman Road and SW Tualatin Road to include two lanes of traffic and a two-lane cycle track. The cycle track is proposed to begin at the intersection of 124th Avenue and SW Herman Road. It continues east down SW Herman Road until it turns into SW Tualatin Road, continuing until it meets the entrance to the Fanno Creek Trail at Tualatin Community Park.

At this point in the route, there is a cycle track junction that provides two route options. One route joins Fanno Creek Trail and diverges again near the Durham off-leash dog park, briefly passing through residential neighborhoods to reach SW Boones Ferry Road. The other route takes SW Tualatin Road to SW Boones Ferry Road and passes directly by the Tualatin Commons. The routes rejoin on SW Boones Ferry Road to reach Bridgeport Village via SW Findlay Road.

On SW Findlay Road, bicycles can share the roadway with cars. We propose repainting of the eastbound lane of traffic with sharrows to clearly demarcate where bicycles and cars share the space. The route passes behind Regal Cinema, Twiggs Bistro, and Martini Bar and leads to the intersection at SW 72nd Avenue. Approaching the intersection, signage will encourage cyclists to dismount and cross the intersection as pedestrians.

Bridgeport Village via Fanno Creek Trail

Where the cycle track diverges, our proposal joins the Fanno Creek Trail at Tualatin Community Park off SW Tualatin Road (Figure 2). The route diverges from the trail near the Durham off-leash dog park. From Fanno Creek Trail, the route picks up on SW Arkenstone Drive, turns onto SW Rivendell Drive, and then turns onto SW Upper Boones Ferry Road, reconnecting with the Bridgeport Village-Tualatin Commons route proposed later in this report.

The benefit of this route option is that it provides a peaceful and scenic route to Bridgeport Village. It will increase the usage of the existing Fanno Creek Trail, and will enhance the bikeability for some residential neighborhoods, potentially increasing property value.

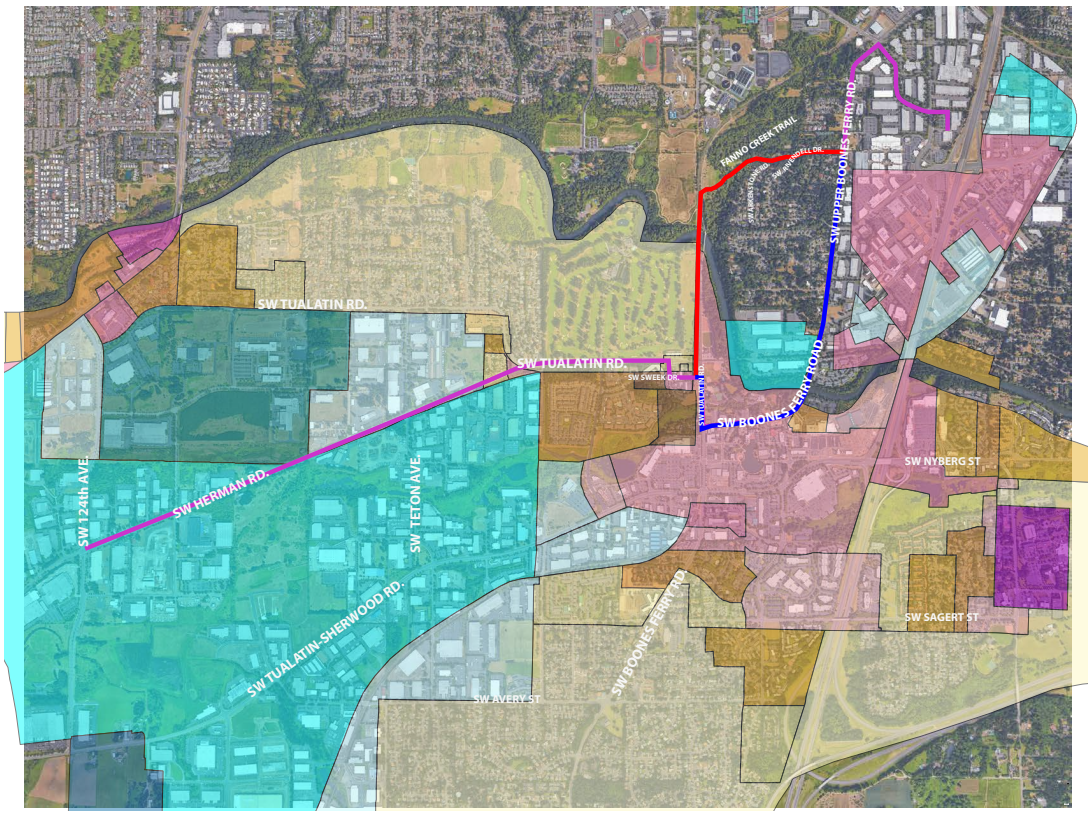

Figure 2: Proposed Fanno Creek Trail connection that improves access to Bridgeport Village.

Route to Bridgeport

Just east of I-5 and north of I-205 is a relatively large residential neighborhood. By making a few key changes and utilizing some of Tualatin's existing infrastructure, the route to Bridgeport Village can be a comfortable ride. By focusing on the intersections at 65th Avenue and Nyberg Street, Lower Boones Ferry Road and 72nd Avenue, and promoting the use of the Tualatin River Greenway Trail, it is possible to make the commute to and from Bridgeport by bike safe and equitable for cyclists.

At the intersection of 65th Avenue and Nyberg Street lies an intersection that would connect the Tualatin River Greenway Trail to commuters dispersed around the neighborhood. According to the Tualatin's Transportation System Plan in the Tualatin Development Code, the intersection of Nyberg Street and I-5 is a traffic collision hot spot. There have also been numerous bicycle collisions along Nyberg Street. To bypass this portion of Nyberg Street, cyclists can opt to take 65th Avenue northbound to the Tualatin River Greenway Trail. At the intersection of 65th Avenue and Nyberg Street, Tualatin could facilitate a safer route to and from Bridgeport Village and anywhere west of I-5 by slightly narrowing the car travel lanes and expanding the bike lanes on either side of 65th Avenue (Figure 3).

The Tualatin River Greenway Trail lies along the Tualatin River, and the trail has won state and national awards for its innovation in design and sustainability. The city of Tualatin estimates that 10,000 people use this trail every month for walking, jogging, and biking. However, residents may utilize the trail for more than just recreational opportunities with a few minor upgrades and a new way of marketing the trail. The trail currently allows bicyclists and pedestrians to cross beneath the I-5 corridor, allowing them to avoid dangerous intersections and making the ride to the western portion of Tualatin enjoyable. As the MAX terminus at Bridgeport Village is constructed, residents will need a way to get there that will avoid the time and inconvenience

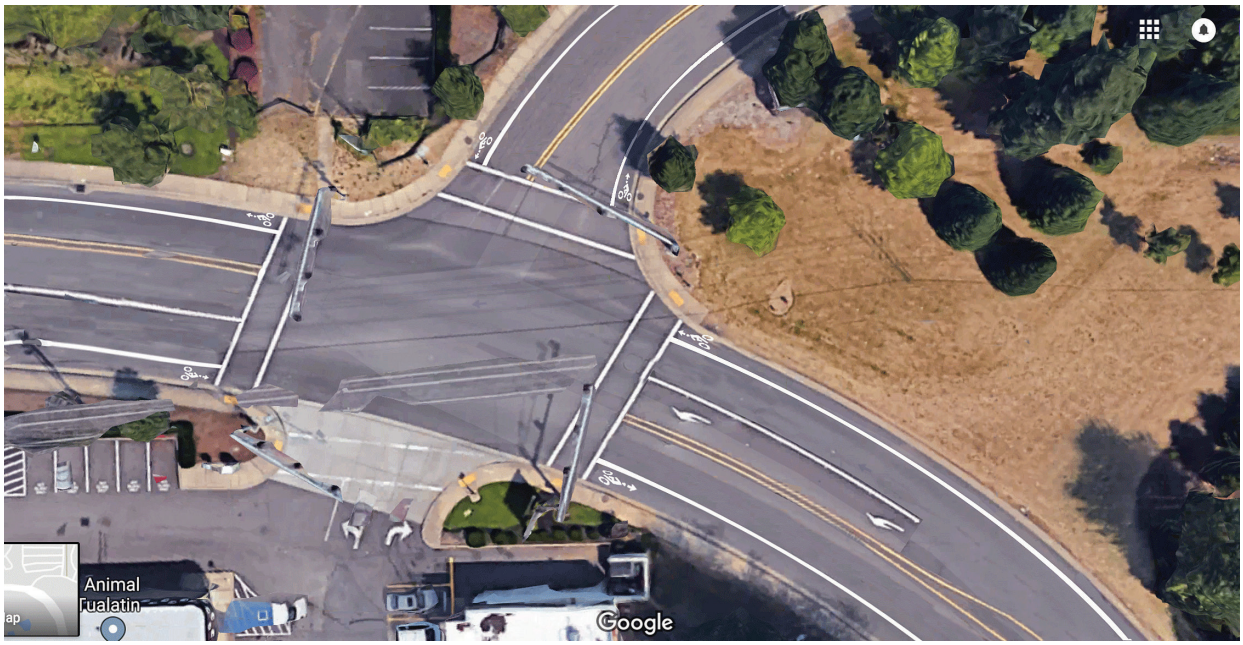

Figure 3: Widened bicycle lanes on Nyberg Street offer an increased level of comfort for cyclists.

associated with driving and parking a vehicle. By marketing the Greenway Trail as a route to and from the Bridgeport Village Station, the city of Tualatin could see its work celebrated even further.

As the trail transitions from being purely recreational to a more utilitarian transportation corridor, the city of Tualatin should consider how the trail can be upgraded to cater to a different set of needs. As residents will likely be traveling to and from the MAX Station in the dark during certain parts of the year, the trail needs a source of light (Figure 4). Wayfinding signs and information should be made available for pedestrians and cyclists, legitimizing their existence on the trail (See the Amenities section for more information). As the trail ends, cyclists must transition back onto paved streets at Lower Boones Ferry Road. To make this transition as smooth and safe as possible for cyclists, we recommend the implementation of high visibility paint to allow riders to move from the Tualatin River Greenway Path onto the road on the final stretch to Bridgeport Village.

The final connection to be made is just outside of Bridgeport Village. As cyclists near the shopping mall, they approach a large intersection with two lanes going in either direction of traffic and a turn lane at each stop. At the intersection of Lower Boones Ferry Road/72nd Avenue and Bridgeport Road, cyclists need to be prioritized in the traffic flow to avoid dangerous interactions with automobiles. By providing painted bicycle boxes at the top of the intersections, bicycles will be able to wait in front of automobiles before they make the turn into the shopping center (Figure 5). The use of high visibility paint is incredibly important, as the visual cue to drivers will allow them to proceed cautiously (See the Amenities section for more information).

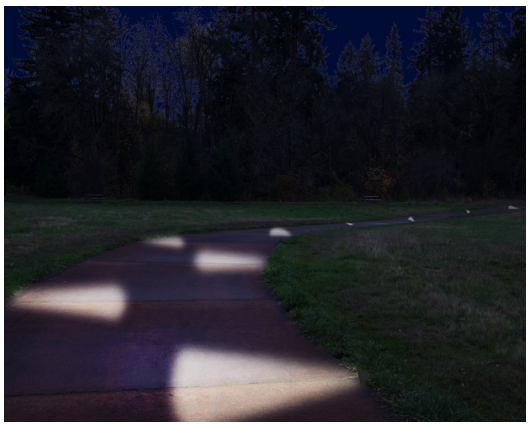
Figure 4: Proposed lighting for the Greenway Trail that creates a more comfortable experience at night.

Figure 5: Suggested SW Boones Ferry Road improvements to increase cyclist safety while crossing.

Bridgeport Village via Tualatin Commons

This proposal focuses on connecting Tualatin Road and Bridgeport Village via Tualatin Commons. Coming from West Tualatin, at the intersection of Tualatin Road and Boones Ferry Road, the pathway would go east and then north across the Tualatin River towards Bridgeport Village.

The benefit of this route is that it remains within the city's boundaries, meaning that the use of street and land falls under the city's jurisdiction. In addition, the opportunities of this option are the future connections that can be made. At the intersection of Boones Ferry Road and Tualatin Road, there is the opportunity for cyclists to transfer to the Tualatin WES station. There is also the potential for the city of Tualatin to expand the bike routes to central and south Tualatin via Boones Ferry Road.

Figure 6: Suggested cycle track that creates more room for cyclists and provides a barrier between pedestrians and vehicles.

Finally, a safe path designated only for bicycles can entice more people to ride bicycles. The addition of the cycle tracks would increase the walkability of Tualatin Commons, thus increasing business activities in the area (Figure 6).

High-Density Areas to Westside Express Service

This part of the project should connect the eastern neighborhood of Tualatin and the Westside Express Service (WES) Station, crossing downtown Tualatin. The aim of this proposal is to reinvigorate downtown Tualatin by increasing the number of people in the center between a major residential area and the train stations. Compared to vehicles that avoid driving downtown, the bikeways should cross it to enhance the sense of community by gathering

Figure 7: Before increasing bicycle visibility on SW Boones Ferry Road.

Figure 8: After increasing bicycle visibility on SW Boones Ferry Road.

people in the same place while using an eco-friendly mode of transportation.

Tualatin has bikeways, but they exist only in a few parts of the city. Moreover, they are not connected at and between intersections. Bikeways that do not have connectivity between routes means that they don't currently represent a functional bike network. The goal of this project is to prioritize bicycles instead of vehicles at every intersection, and, at the same time, make the intersections safer for users of any age.

In order to increase the number of bike trips by Tualatin residents, the city could consider making bicycle lanes more comfortable and safe. To do this, the lanes should be more visible by drivers and, when possible, separation increased from vehicles as much as possible. Following this method, we propose establishing a third bikeway partly along the river. This way, bicycles are physically separated from the traffic. Unfortunately, this physical separation is not possible everywhere. Therefore, the city may choose to color the bicycle lanes at important intersections and have these bicycle lanes lead to bicycle boxes. The green color and the bicycle boxes should increase motorist attention towards cyclists (Figures 7-8).

Herman Road Connection

Currently, Herman Road is not necessarily a bicycle-friendly environment. No bicycle lanes or shoulders are present, meaning the area is unsafe and unwelcoming for cyclists. SW Herman Road is a connector road for many who commute to the business park centers, such as Lam Research, and to downtown Tualatin or the residential areas of the city. Tonquin Greenway Trail and Tualatin River Greenway Trail both converge in this area, making SW Herman Road an important one to be redeveloped into a safe and welcoming road for all modes of transportation.

Our proposal includes adding bicycle lanes, sidewalks, or both to improve ridership along this road. Safer and more attractive, the bicycle lane could easily be accessed from the greenway

Figure 9: Painted bicycle lanes increase cyclist visibility, making their trips safer.

trails. This provides a way for cyclists to get where they need to go after exiting the bicycle greenway trail system.

Wayfinding signs for cyclists improve their ability to get from place to place by bicycle. Improved signs for motorists, indicating bicycles are on the road, should also be included in the design. Bicycle route signs with arrows could be included, along with mileage-to-destination indicators.

Figure 10: SW Herman Road before (left) and after (right) bicycle improvements are made.

Both on-street painted signs and notifications such as painted buffers, colored bike lanes, and bike lane symbols could be included (Figure 9). At eye level, road signs for vehicles would also be needed. *Share the Road, Bikes on Road,* or *Watch for Bikes* are some examples of verbiage for the signs (Figure 10).

Infrastructure Improvements

SW Tualatin Road

At this location, there are currently pieces of bicycle lanes that were added toward the end of the roadway, but there is no bicycle lane before this portion of the road. This forces cyclists to either ride in the road, where there is currently no shoulder, or use the sidewalk, potentially crowding out pedestrians. These unsafe conditions may deter bicycle ridership and cause confusion to cyclists. Disjointed and incomplete bicycle lanes can create unsafe conditions when cyclists must either swerve on and off the sidewalk or in and out of vehicle traffic.

Our proposal is to make portions of the center turn lane smaller, which would allow for a bicycle lane to be integrated onto the road. Another option is to shift the sidewalk to create a bicycle lane. If neither of these is feasible, the use of a painted sharrow on the roadway, with signage for motorists and cyclists, should be considered. This would allow motorists to have visual cues for the presence of cyclists. For both recreational and commuter traffic, this effective change is helpful for cyclists along Boones Ferry Road as well as those exiting or entering the Tualatin River Greenway Trail and continuing on through the area (Figures 11-12).

Figure 11: SW Tualatin Road before (left) and after (right) bicycle lane improvements.

Figure 12: SW Tualatin Road before (left) and after (right) the addition of a sharrow.

Visually Connect Bikeways

Visual cues are key for wayfinding in a built environment. In addition to wayfinding signs, our suggestion is to continue the blue line, as seen on the Tualatin Greenway Trail, onto the roads of Boones Ferry and Tualatin.

The existing Tualatin River Greenway Trail is a somewhat new addition to Tualatin. It provides tree coverage and an educational wayfinding system on which participants can learn and exercise simultaneously. The path has been successful, and the path is currently in the process of being extended. Extending the trail indicates that Tualatin residents are active and could benefit from easily accessible trails and paths.

Because of the connectedness of the city, we propose a colored path to signify where the Tualatin River Greenway Trail connects with the Tualatin Commons and the Tualatin Community Park and Recreation Center.

This path would create a visually appealing way for Tualatin residents and vistors to connect the city's landmarks. The Greenway Trail is already utilized for walking, socializing, or simply observing the beautiful environment of Tualatin. The Tualatin Commons is a manmade lake home to many upcoming Tualatin traditions, such as the Pumpkin Regatta and the summer concert series. The Tualatin Community Park and Recreation Center is home to basketball and tennis courts, a playground, skate park, and many more activity-inducing attributes. Ideally, connecting these three sites would create a united feel for the city, while promoting exercise and healthy living.

This small colored line would hopefully provide a huge impact for increasing familiarity with the Tualatin landscape and, in turn, navigating the city, be it for exercise or entertainment. The line is already on the Tualatin River Greenway Trail, educating those using it about the last ice age. Similar to the educational line on the Greenway Trail, we propose a blue curved line on the space adjacent to the curb on Barngrover Way, turning left at SW Boones Ferry Road. Pedestrians and cyclists would be able to follow this line to the nearby parks. From SW Boones Ferry Road, the line would continue to Tualatin Road, which leads to the Tualatin Community Park and Recreation Center.

57th Avenue Bicycle Boulevard

One potentially relatively simple but impactful change we suggest for the east Tualatin neighborhoods is making 57th Avenue a bicycle boulevard. 57th Avenue has already been designated a "bike route," has signs showing it as such, and is identified as a potential bicycle boulevard in the Tualatin Development Code (TDC). Currently, the TDC only recommends part of 57th Avenue to be a bicycle boulevard and is monitoring bicycle usage before turning it into

Figure 13: Borland Road before (left) and after (right) the curb cut.

Figure 14: Borland Road before (left) and after (right) the visible crossing.

one. However, we recommend turning all of 57th Avenue into a bicycle boulevard. Doing this involves a few tweaks to the existing streets that could make them much more bicycle friendly.

The first improvement to 57th Avenue we recommend is making the cut through the path between SW Borland Road and SW Sequoia Drive across from 57th Avenue more bicycle friendly. The existing path is a great off-street option for the residents living south of Borland Road wanting to walk or ride north. However, from Sequoia Drive, cyclists currently have to use residential driveways to access the path, meaning that the entrance could potentially be blocked by residents' vehicles. From Borland Road, there are no curb cuts to get onto or off the path (Figure 13).

Our next proposal is to improve crossings for bikes across Borland Road between the path and 57th Avenue. One option is so-called "cross-bikes" markings. These markings have been used in Portland and signify an area where bicyclists are likely to cross. The markings alert drivers and also add an element of confusion since they are new and relatively uncommon. This confusion causes drivers to slow down, making crossings safer for cyclists (Figure 14). In addition, the markings would provide a visual connection to 57th Avenue as a bicycle boulevard.

Our final proposals for this section of the project apply to 57th Avenue itself. Right now, the only designation for 57th Avenue as a bicycle-friendly route are bicycle route signs. To further increase bicycle safety, we recommend adding painted sharrows on the road. Sharrows don't change the road physically, but they can remind motorists of bicyclists' presence, help delineate what road to follow for the bike route, and show bicyclists the best part of the road to bike on—so that they avoid being hit by car doors opening (Figure 15).

Figure 15: 57th Avenue before (left) and after (right) the addition of chicanes and sharrows.

We also propose adding traffic calming devices such as chicanes to 57th Avenue. Chicanes are curb sections that go out into the road and require drivers to reduce speeds to navigate around them and other vehicles. Reducing vehicle speeds is safer for bicyclists and would make 57th Avenue a true bicycle boulevard. In addition, chicanes are usually landscaped to be aesthetically pleasing and environmentally-friendly. They would reduce some on-street parking, but given that plenty of off-street parking exists in this region already this should not be problematic.

Amenity Improvements

In addition to the proposals made above, the city of Tualatin's current bike infrastructure has the potential to become remarkable with a few amenity improvements.

Lights

We recommend the addition of pathway lighting along the Tualatin River Greenway. This way, people commuting to and from work at early and late hours won't be discouraged from traveling along this path by walking or biking because it is too dark. Especially with daylight savings and varying work hours, it is important to address the possibility that people may be traveling in the dark for work, school, and other activities. We suggest small walkway lighting rather than taller extensive light posts because this can effectively and inexpensively allow people to see where the sidewalk runs as well as possible objects that may be on the path while traveling at night. The Tualatin River Greenway is currently seen and used as a recreational walkway. As mentioned earlier, we encourage the city of Tualatin to think about the possibility of this separate pathway becoming a part of the travel infrastructure for people biking or walking to their daily activities.

Signage

There are currently green 'bike route' signs with arrows placed along 57th Avenue leading to the Tualatin River Greenway. These signs begin to help people biking down this road feel comfortable and welcome. However, it is unclear as to where this bike route is meant to go. Additionally, the routes that we have chosen to focus on have very little 'wayfinding' infrastructure to help people on bikes find their way to either Bridgeport Village or WES station. When searching Google Maps for a certain route to Bridgeport Village by bike, no routes were found.

To address the uncertainty of where one might be able to bike to, we recommend that the current bike route signs be upgraded to include the possible destinations that someone could bike to from 57th Avenue to help with 'wayfinding.' In other words, it will show people that they are able to bike to a specific destination, such as Bridgeport Village, rather than only knowing that they are able to bike on a particular road. Other additions to these signs, such as time of travel and distance to the various destinations, are good details to providing additional information and could mean the difference between choosing to bike or not. We recommend considering where wayfinding signs could be placed, and what destinations the city would like to include.

Parking

Bike parking is an important feature to promote biking to certain destinations and can be used in a creative way. We recommend that bike parking be made a priority, especially at high volume locations, such as Bridgeport Village and the WES Station. Providing short-term and long-term bicycle parking around high use transit services, like the MAX, is beneficial for cyclists and for the public transit service overall, as it saves space around the bus station and on the bus itself.

Currently, the WES Station has a large covered bike rack area, and eight bike storage lockers. The storage lockers are a good addition for frequent and long-term users. However, some of the information that explains how to use the lockers is worn out and unreadable, making them confusing to use. We recommend maintenance on the bike storage lockers, such as removing the graffiti that covers the phone number required to rent a locker.

High Visibility Lanes

Increasing the visibility of bicycle lanes is essential to ensuring cyclist safety. Cyclists may feel unsafe in some large intersections in the existing infrastructure. Either the bike lane does not continue on through the intersection, or the bike lane wasn't prominent enough to be noticed by people driving. To counter this issue, we suggest that bike lanes be painted green coming up to as many big intersections as possible along the routes from the 57th Avenue area to WES Station and Bridgeport Village. There is also the possibility to continue the paint through the entire intersection to create a more prominent view of the bike lane for people driving. The current design at intersections in Tualatin place the bike lanes next to the curb, so that when cars are making right turns people on bikes are generally more hidden to the driver and the two travel modes come into conflict with each other. There is often confusion whether the car or the bike goes through the intersection first. Formal laws state that whomever reaches the intersection first has the right-of-way, but often there is a lingering question as to whether the person on the bike was seen or not by the person in the car.

Traffic Calmers

Adding traffic calming is also an effective way to make an environment better suited for biking and walking. These are obstacles that are put into a road system in order to tame the activity of drivers. Some ideas for traffic calming are speed bumps, 'sharrows', bends in the road, and making roads more narrow, as a way to naturally reduce the speeds of cars. Trees, benches, and fountains are other amenities that show that this is a public space meant for people walking or biking while also causing vehicles in the area to slow down. By creating an environment that is less comfortable for cars, more people will choose to either avoid these areas while driving, slow down while driving through these spaces, or bike there instead. We suggest adding in desired traffic calming devices in designated bicycle routes that may not have a bike lane or separate path, such as 57th Avenue.

Bicycle Maintenance

Another possible amenity that can provide a more satisfying experience for cyclists is bike repair stations. These stations are designed to hang a bike to quickly fix small problems and include various tools, such as bicycle pumps. These stations are a great way to give relief to people on bicycles and to show people that biking is accepted and encouraged in the area, with the hope that people will bike on that route. We suggest placing repair stations at the WES Station, the MAX Station at Bridgeport Village, and at the entrances and exits to the Tualatin River Greenway. The bicycle repair stations would be more effective at these locations because these are open and visible areas. Furthermore, these are the few spots along the two routes from 57th Avenue to WES Station and Bridgeport Village where someone would be able to safely dismount from their bike to take it to the repair station.

Overall, any of these features would lead to an increase in the number of people biking around in Tualatin and would improve the experience. We encourage the city of Tualatin to pick and choose any of the above amenities after determining the most desired and feasible additions for the Tualatin community.

Technology

bikeTualatin App

Purpose

The purpose of the bikeTualatin App is to promote biking as a fun, popular, and healthy form of transportation. In order to encourage the citizens of Tualatin onto bikes–and perhaps get them out of their comfort zones, the app will be linked to an incentives program and social media. This will allow users to be rewarded biking while being able to share their successes and adventures with others.

Figure 16: An example of what the app would look like on the home screen of a smartphone.

How it Works

The bikeTualatin App will be available for any smartphone and works in conjunction with its internal GPS (Figure 16). When users select the "Start Ride" feature, the app will track the distance and route of the ride. The app will keep a running tally of the user's total miles, time spent, and locations visited while awarding "stars" at various benchmarks. These stars will then be exchangeable for various coupons provided by local vendors, thus promoting business while incentivizing healthier and more sustainable transportation.

Incentives

In order to create a wide range of incentives, local businesses would be recruited and invited to join as partners with the bikeTualatin App. As a partner, they would help promote biking by creating specialized coupons or discounts for those earning stars through the app. Any business would be able to partner with the bikeTualatin App, but those within popular locations like Bridgeport Village would be encouraged more intensely to join.

Figure 17 shows examples of how the incentives within the app would look. The far left photo shows the home screen where users can see how many stars they earned on their ride, what incentives they currently have, start a new ride, or share a post on social media. The middle photo depicts incentives earned and stored from various partners within the app. The far right photo shows how the phone's GPS will sync to show mileage, time, and route for every ride started.

Figure 17: Screenshots of the bikeTualatin app in use, showing its different main screens.

Social Media

Within the bikeTualatin App, there is an option for users to share their past rides, total mileage, or any other statistics being calculated within the app. The app will be able to sync to the user's social media platforms if they input their various credentials on their profile. This would help cultivate a sense of community with those using the app while also encouraging others to be involved.

The bikeTualatin Card

For those who do not have a smartphone or would like another way to track points, there will be a bikeTualatin card (Figure 18). This card could be scanned at any of the bikeTualatin parking stations when a user locks up their bicycle, indicating a bicycle trip to a popular destination. Utilizing shared bicycles at the parking stations would also give points. When checking out a bicycle at the kiosk located within the parking station, a cyclist would simply swipe the bikeTualatin card to accrue points. To link the app and the card together, the cyclist would simply type the card number into the app, and the points would sync onto both devices. This way, a user could utilize incentives by either scanning codes on their smartphone or by swiping their card at partner locations.

The bikeTualatin cards could be distributed at partner locations or at city offices. The card could be free, or it could have a small fee that could fund bike infrastructure projects around Tualatin.

Figure 18: A rendering of the proposed bikeTualatin card.

bikeTualatin Bike Parking Stations

These stations (Figure 19), whose goal is to encourage citizens to bike by providing a safe, dry place to lock up their bike, would work in conjunction with the app or as a substitute if someone does not own a smartphone. The rider would simply swipe the bikeTualatin card at the parking station in order to receive the points. If the card is connected to the app, their points would be added with the mileage and, if not, points would be collected on the card itself.

Additionally, these stations could include shareable bikes. These bikes would belong to the city, but cyclists could borrow them temporarily and then return them to any other parking station. There would be an additional fee associated with borrowing the bike. The fee could be paid at the kiosk, and points can be earned with these bikes as well.

Figure 19: A rendering of a proposed bikeTualatin parking station.

Launch Event

With the launch of the bikeTualatin App, education for using the app would be helpful, as well as an incentive to participate. For many, bicycling will be new and possibly outside of their comfort zones. By creating a community event, city officials and app creators would be able to engage, educate, and excite the community members of Tualatin about the potential new forms of transportation.

We recommend that the main event would take place at the new MAX terminus, located east of Bridgeport Village. This location was chosen in order to tie together the ideas of newness, innovation, and accessibility. The creation of a new MAX station at this location would provide transportation for many either coming to Bridgeport Village or travelling to and from other work

locations in and around Tualatin. It would open up a new form of transportation that allows many groups of people to travel with ease or to areas they were unable to access before. Additionally, this would reduce the frustration that traffic causes.

At the event, there would be booths created by community partners. These booths would be created with E-Z Up Tents and folding tables, similar to a farmer's market style. Among those being invited to have a booth would be the app creators, city officials, local partners who are providing incentives on the app, TriMet, and a local bike shop. Other groups could ask to participate, but only those promoting alternative forms of transportation or those partnering with the app would be allowed to have a booth at the event. Additionally, in order to foster the idea of safety and comfort, pop-up bike lane protections could be added along the bike lanes. Doing this would add physical separation between cars and bicycles.

At the event, a miniature course would be setup for children to learn bike safety. They would be able to ride around the course while learning to follow basic street signs and arm signals for turns. An adult version of this class would be at a booth along with handouts containing basic bike rules.

With the creation of a community event and establishment of pop-up protected bike lanes, the residents of Tualatin would be empowered to explore new forms of transportation. This event allows the public to be engaged in new ideas as well as become more connected with their local government, businesses, and neighbors. Our hope is that every citizen of Tualatin would feel comfortable traveling to destinations by bike while bettering their health and the environment around them.

Bike Share

A bike share system would greatly improve ridership within Tualatin. Those visiting the area for recreation or for work would be able to utilize both the TriMet railway as well as Tualatin's bicycle lanes and trail system.

A commuter may find it easier and more relaxed to take the rail or bus line into Tualatin, but once in the city, may want to ride a bicycle for ease of getting around. If bike share docking stations are positioned at all major Park and Ride stations, as well as Bridgeport Village Station, Tualatin Commons, Tualatin Community Park, and at major employer centers such as Lam Research and Kaiser Permanente, bicycle ridership would likely increase.

Those who want to bike short distances in the Tualatin area but have taken public transit to the area would be able to utilize the service. Citizens within the city could recreate for an afternoon, use the bike share service as a regular transportation system, or ride a bicycle to a TriMet station and hop onto a train to Portland for the day. This would give commuting cyclists who don't want to ride all the way to Tualatin from Portland an opportunity to utilize both modes of sustainable transportation.

To increase ridership, larger employers could offer discounts or further incentives for employees. Local involvement with citizens for docking station advertisements and public artwork could also be considered.

Theme 3: Transit

MAX Terminus Parking Lot Redesign

The proposed MAX Park and Ride location in conjunction with the new MAX terminus provides ample space for motorists to park their cars, but we recommend additional improvements for pedestrians and cyclists using the MAX system (Figure 20). The areas for improvement include safety, walkability, bicycle storage, and quality of experience. The site is currently surrounded by high volume roads with very little noise or sight obstruction protecting pedestrians from their

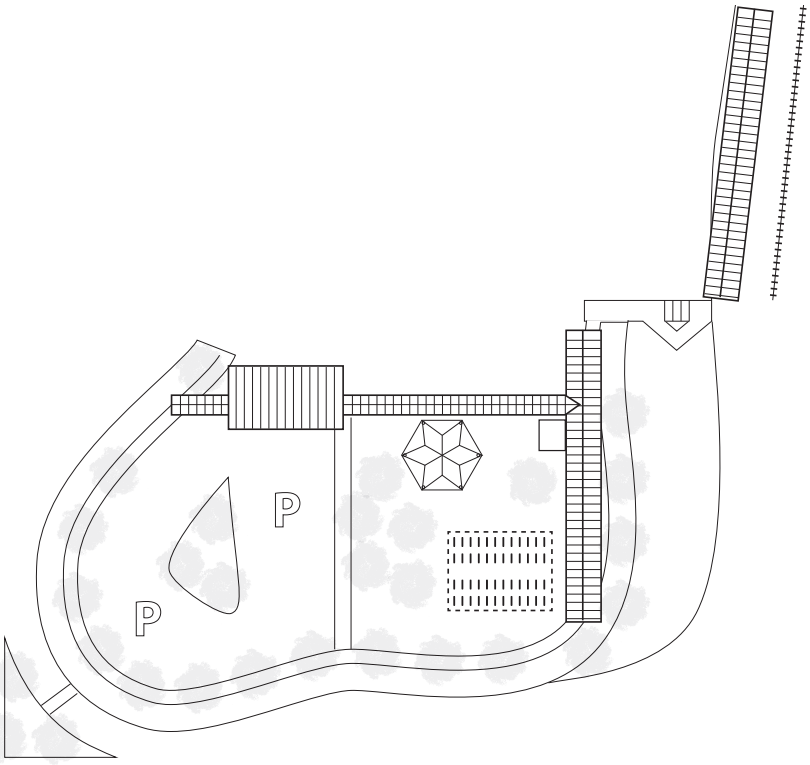

Figure 20: Site map of the proposed MAX station redesign.

effects. As the Park and Ride will be serving light rail users, it is important to remember that all transit users are pedestrians first.

Looking to the future, it will be important to design this space to accommodate pedestrians, cyclists, and motorists. Currently, the proposed design focuses heavily on motorized vehicles. As the main use of this site is changing, we are proposing to add a placemaking aspect to the redesign of the parking lot.

Challenges

The connection between the Park and Ride location and Bridgeport Village poses a safety risk for pedestrians. To the south, pedestrians must cross a lane without a signaled crossing to a traffic island. This signaled lane connects to the I-5 offramp and hosts cars moving at high speeds around a curve. The pedestrians are then channeled to a second, signaled crossing where they must cross an additional four lanes of traffic. This south entrance to Bridgeport Village is the natural pedestrian entrance to the mall. Pedestrians also have the option to enter via the north entrance. This entrance involves a five lane signalized pedestrian crossing with good visibility. However, the north entrance does not provide comfortable amenities for pedestrians as they enter Bridgeport Village, as they must cross a large parking lot in order to access the mall.

Strategies

The strategy for this proposal is to make the space in and surrounding the Park and Ride feel comfortable for pedestrians. The Park and Ride provides a way for commuters to get to the inner city easily, but it also allows city dwellers to visit Tualatin with ease. As we look to redesign this space, it is important that we give MAX riders a pleasant experience as they arrive in Tualatin. Greenery, noise reduction, protected pedestrian pathways, and improved multimodal options should all be incorporated into this proposal.

Solutions

As mentioned at the beginning of this report, the parking lot converted to a MAX stop has room for major redesign. The improvements will attempt to mitigate the effects of high street volumes and speeds, infrastructure that discourages walking and biking, and a lack of beautification.
The design recommendations for this project are listed below:

- Built up greenery around perimeter of the site: this will shield pedestrians from the sound and view of fast moving vehicles. It will also offer beauty for people waiting for the light rail to arrive.
- Semi-permeable pavers: using a different material to pave the site would give vehicles and pedestrians entering the space the idea that it is different and needs to be approached with their full attention.
- Sheltered pathways to the north and south entrances: these would incentivize pedestrians to walk to the improved pedestrian crossings at the north and south entrances of Bridgeport Village.
- Covered bicycle parking: in this proposal, covered bicycle parking would be provided to the north and south of the MAX stop.
- Public art: public art would be incorporated into the waiting space.
- Wayfinding: signs would guide pedestrians exiting the MAX to the various destinations in Tualatin: Bridgeport Village, historic downtown, and connections to nearby regional transit lines.

Bus Rapid Transit

In addition to the aforementioned proposals, it is also important to think about the role of transit in a city. As not all residents are physically able to walk or bicycle even short distances, transit is vital to improving accessibility in the city. Because of this, we suggest adding a bus rapid transit (BRT) system (Figure 21).
The elements of BRT include:

- Having a large enough bus that has the capacity to hold more riders.
- Not accepting money or tickets upon entrance, as that slows down the pick-up time.
- Having dedicated BRT lanes in parts of the corridor.
- Using right-of-way tools that shorten travel time.

Proposed Routes

The initial proposal is to create a route connecting the Tualatin Commons and Bridgeport Village. This would be ideal for commuters, as it would act as a connection between the MAX Terminus and the existing WES Station.
Some suggested names for this bus service would be either the *Bridgeport Express* or the *Tualatin Trolley.*

Expansion

After the initial implementation, the routes could be expanded to include the industrial regions to the west and the residential regions to the south. *Note: a slight alteration to the route shown below could be to include Tualatin Road north of SW Herman Road.*

BRT Techniques

To make BRT effective, traffic priority needs to be given to the buses. In order to do this, we recommend the following techniques:

- Changes to the street design. For example, the center median area on Boones Ferry Road could be dedicated to the BRT traffic, where possible.
- Redirecting bicycle traffic so that there is no multimodal conflict.
- Using queue jumps to give buses a head start.
- Redirecting traffic except for buses, such as turning lanes into "right turn except bus" lanes.
- Using "all-door boarding."

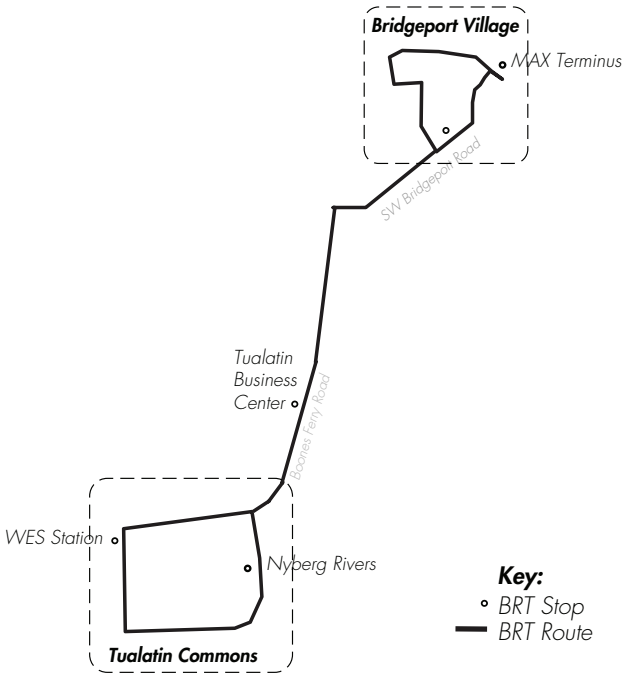

Figure 21: Proposed initial BRT route

Bus Stations

In addition to the BRT routes, we recommend "anchor" bus stations that could act as hubs for the BRT. Figure 23 shows proposed stations, complete with their locations and amenities.

Bridgeport Station

At this station, there could be extended and raised sidewalks to ease the boarding process. There could a large, covered shelter that allowed bus entry and exit from the front and back. Finally, it could provide direct connections to the new MAX terminus. This station would most likely be located next to the MAX terminus, in the parking lot on 72nd Street.

Business Station

To provide incentive and ease for those riders who are going to the industrial region, there would be a Business Station located on 119th Street off of Herman Road. This station would be similar to the Bridgeport Station and include the same amenities, such as covered walkways and raised sidewalks for ease of access.

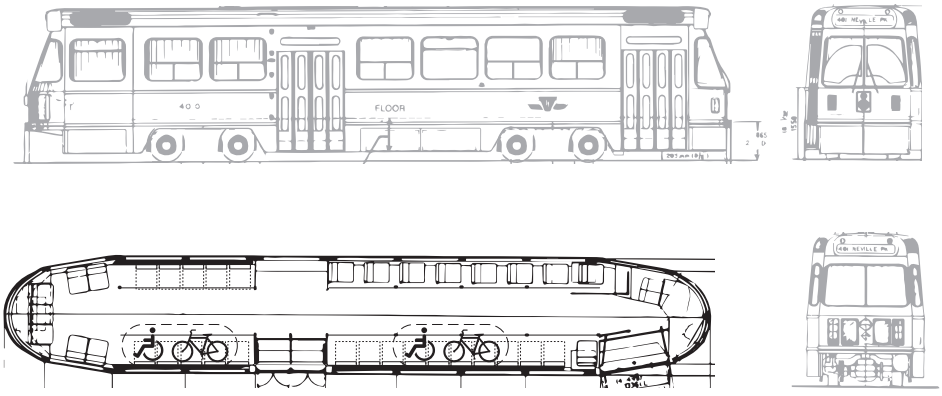

Figure 22: A mockup of a potential BRT bus.

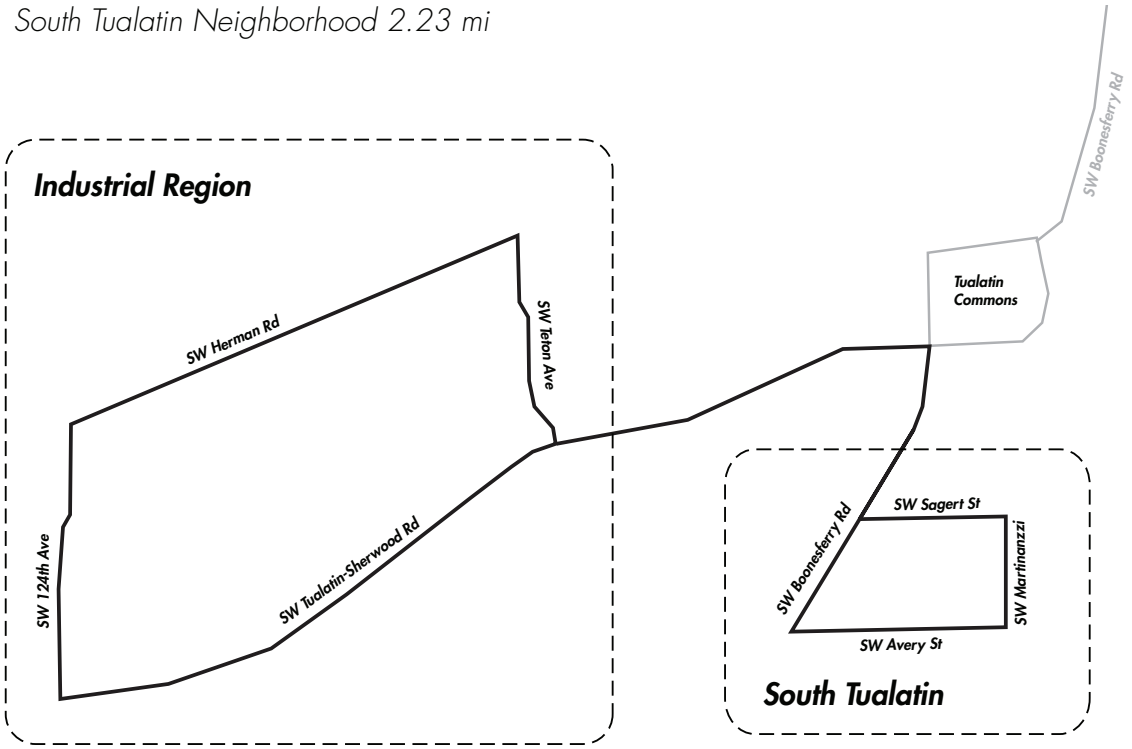

Figure 23: Proposed BRT route expansions that would include the industrial and residential regions of Tualatin.

Safety and Accessibility

With added transportation options in our proposed redesign, it is important to consider safety and accessibility. We have placed emphasis on routes and roads as well as improving public transportation stops and shelters to create a secure and welcoming environment for individuals who are waiting for transit.

The center bus lane we have proposed prioritizes public transportation over private vehicles. This decreases the number of cars on roads, leading to long-term safety and better flow of traffic. There is also a separation between bus stops and bike lanes, allowing for safer and more cohesive infrastructure between two forms of sustainable transportation.

Creating safer and accessible bus stops and shelters can be done by providing seamless transition from standing at the stop to boarding the bus. Designing stops with bus bulbs and raised platforms that are flush with the bus makes the bus more wheelchair accessible and reduces passenger loading delays, as a space for the bus is created separate from traffic. This can also be done with existing TriMet stops. Providing crosswalks and lighting at bus stops/ shelters increases a sense of place for pedestrians and those riding transit.

Improving the safety and accessibility of infrastructure in a community leads to the positive short- and long-term benefits we have highlighted previously, including increased ridership, less congestion, and overall happier citizens.

An Automated Future

Integrating new technologies is an important consideration for a flexible system. Electric and autonomous vehicle (AV) technology is rapidly expanding. Transitioning to electric AV shuttles has been proven to become more affordable in the long run by lowering operating costs, and decreasing greenhouse gas emissions, while increasing accessibility and safety. The proposed BRT system can be used to integrate existing public transportation options, effectively reducing

single-occupancy trips and congestion. Ideally, environmental, social, and economic benefits of these proposals will help reveal Tualatin as a place to be.

Conclusion

The city of Tualatin can become a haven for sustainable transportation. The residents of Tualatin are ready to make a change towards a less congested and more accessible experience, and the students in Marc Schlossberg's Sustainable Transportation class developed proposals that could greatly aid in creating this reality. This was done in response to the city's goals, as outlined below:

- Increase accessibility for employers and employees.
- Reduce congestion felt by the entire city and its neighbors.
- Design (or redesign) transportation systems to accommodate an aging population and children.

The students in this class worked to improve pedestrian, bicycle, and transit infrastructure. They redesigned streets for bicycle safety, created bus rapid transit routes, and designed the MAX terminus parking lot to have as good a pedestrian experience as possible.

We hope that these suggestions will offer assistance in navigating the challenging world of transportation planning, and we wish the best for the city of Tualatin and its less congested future.